ASETS DEFENSE
ADVANCED SURFACE ENGINEERING TECHNOLOGIES FOR A SUSTAINABLE DEFENSE

ESTCP

SERDP
DOD • EPA • DOE

Overview of Options, Issues, etc.

Keith Legg
ASETSDefense Technical Manager
ASETSDefense Cd Workshop
Aug 30, 2011

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
30 AUG 2011		**00-00-2011 to 00-00-2011**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Overview of Options, Issues, etc.	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **Rowan Technology Group,1590 S. Milwaukee Ave., Suite 205,Libertyville,IL,60048**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES
Focused Workshop on Cadmium Plating Alternatives, August 30-31, 2011, Baltimore, MD. Sponsored by SERDP/ESTCP.

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT **unclassified**	b. ABSTRACT **unclassified**	c. THIS PAGE **unclassified**	**Same as Report (SAR)**	**8**	

Specified and qualified Cd alternative technologies

	Connectors	Fasteners	Components
CRES alloys	✓ Wide use	✓ esp GTEs, composites	✓ PH steels, S53
Al: AlumiPlate, IVD, spray	Spec, AP Qual	✓ IVD avail, AP In test	✓ Wide use
ZnNi (old acid, new LHE alk)	Spec	✓ Boeing Qual	✓ USAF validated
Metallic-ceramics			✓ Abrasion/corr
Dip-spin Al/Zn filled polymers		✓ All commercial vehicles, some mil	
Electroless Ni-PTFE	✓ In-house coating		

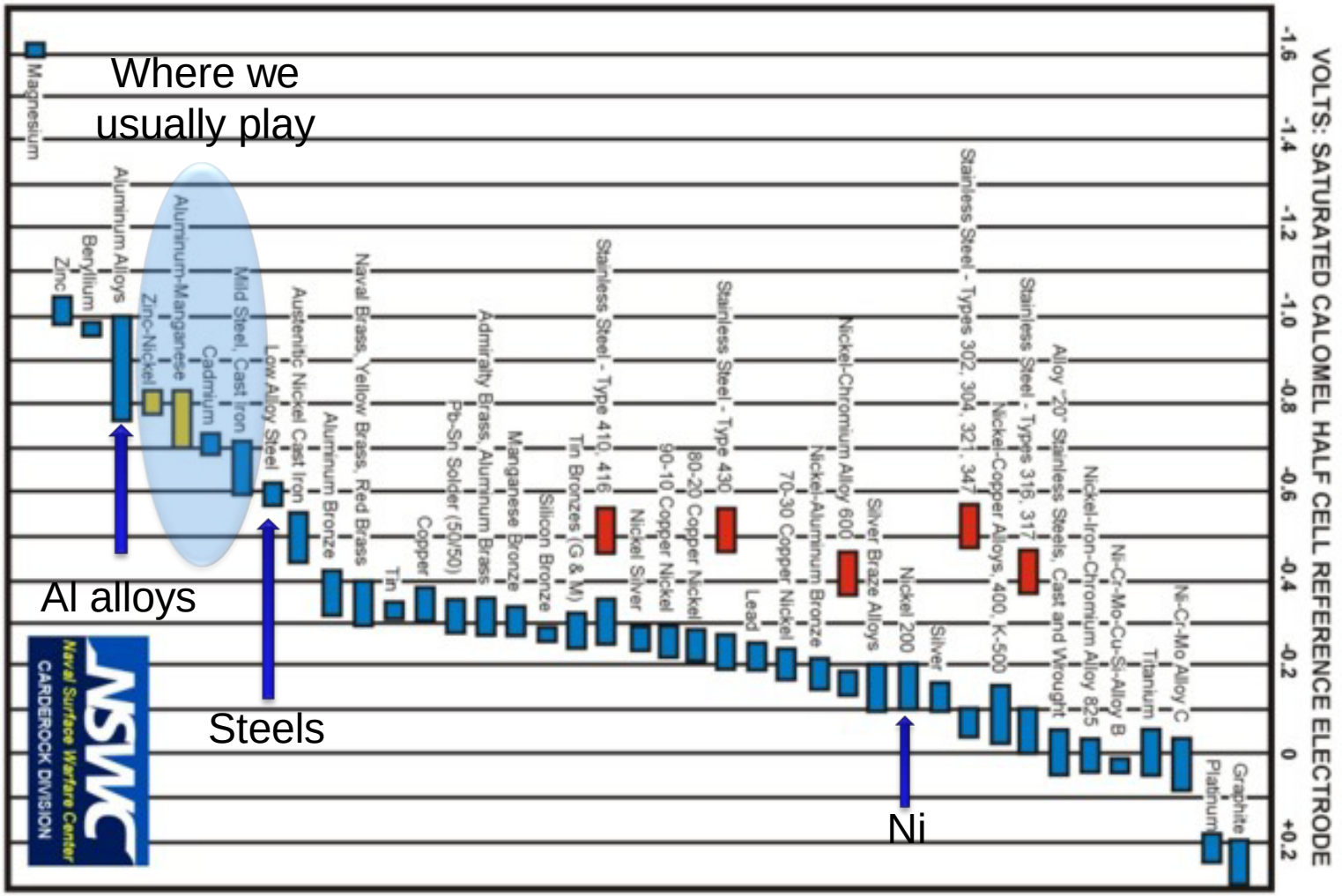
Chromate conversion and alternatives

- Alternatives
  - Cr^{3+} sealers (Zr and other inhibitors)
  - Non-Cr sealers (Zr, Mn, Mo, rare earth)
  - Adhesion promoters (AC-131, Prekote)
  - Electrolytic “mineralization”

Primary issues

- AlumiPlate
  - Better performance than Cd; sole source, toluene bath
- LHE ZnNi
  - Looks as good as Cd; below spec conductivity on connectors
- Dip-spin – fasteners only
  - Excellent for vehicles, what about aircraft, vessels?
- Electroless Ni-PTFE – connectors only
  - Excellent corrosion, conductivity; galvanic mismatch, not sacrificial

Galvanic issues



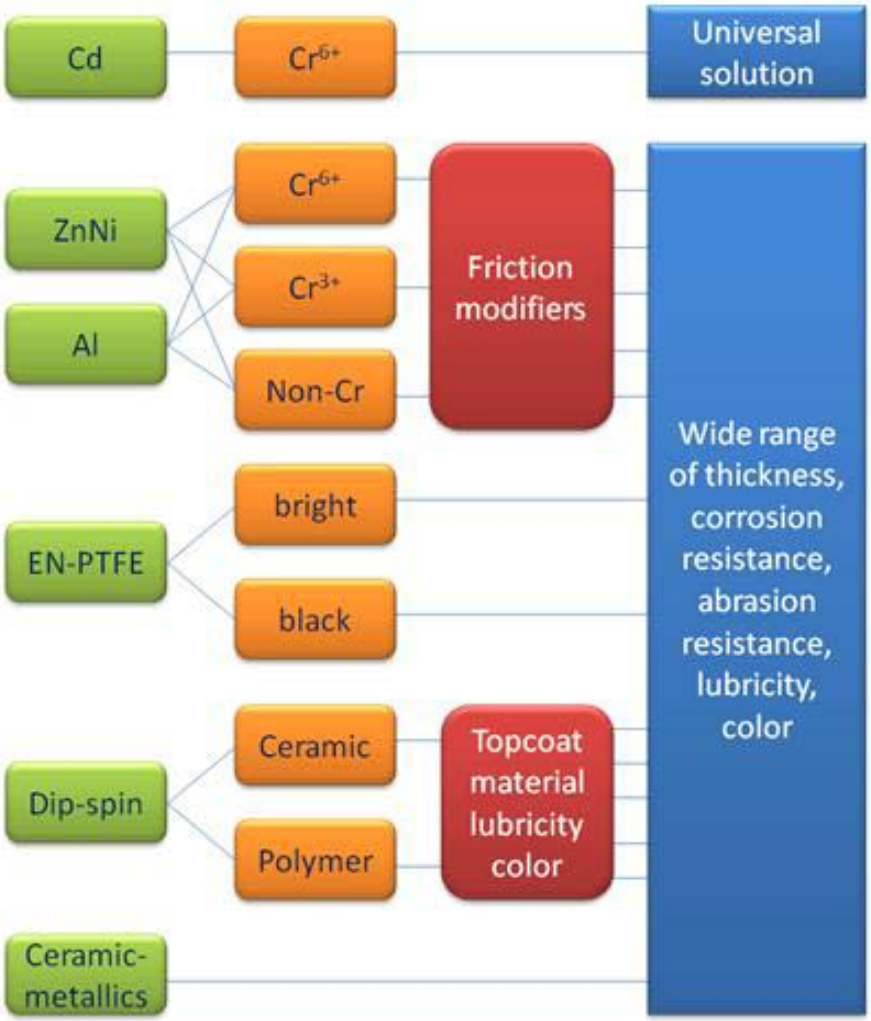
Specs

- We will need to modify specs to accommodate new coatings
- Say goodbye to olive drab!

Compatibility

- Galvanic compatibility (esp. EN-PTFE)
  - Primarily Ni to Al or any anodic coating
  - Smaller differences between anodic coatings
- Torque-tension (esp. Al)
  - Differences between different coating systems
  - Largely alleviated by friction modifiers (DFLs)
- Tolerance, paintability, etc. (esp. dip-spin)
  - Different thicknesses, different prep, adhesion

Logistics



Capabilities and ease of use
vs
standards and logistics